

Application No. 09/615,545
Attorney Docket No 2000B009A
Amendment Dated October 9, 2003
Reply to Office Action of June 25, 2003

REMARKS

Reconsideration of the above-identified application in view of the following remarks is respectfully requested. Claims 17-30 and 51-66 are now pending for the Examiner's consideration. For the reasons that follow, Applicants believe all claims are in condition for allowance. Applicants acknowledge with appreciation the withdrawal of the rejections raised in the previous Office Action.

Rejection of Claims 17-30 and 51-66

Claims 17-30 and 51-66 have been rejected under 35 USC 103 as being unpatentable over U.S. Patent No. 6,051,746 (Sun). Applicants respectfully traverse this rejection.

Claim 17 sets forth a method of making an olefin product from an oxygenate feedstock. The method comprises contacting a silicoaluminophosphate molecular sieve having a porous framework structure with a hydrocarbon at conditions effective to form at least an integrated hydrocarbon co-catalyst within the porous framework. Then, the silicoaluminophosphate molecular sieve containing the integrated hydrocarbon co-catalyst is contacted with an oxygenate feedstock under conditions effective to convert the feedstock to the olefin product. The silicoaluminophosphate molecular sieve has a catalytic activity index for methanol conversion at 250°C of at least 2.

Claim 27 sets forth a method of making a polyolefin from an oxygenate feedstock. The method comprises contacting a silicoaluminophosphate molecular sieve having a porous framework structure with a hydrocarbon at conditions effective to form at least an integrated hydrocarbon co-catalyst within the porous framework. The silicoaluminophosphate molecular sieve containing the integrated hydrocarbon co-catalyst is contacted with an oxygenate feedstock under conditions effective to convert the feedstock to an olefin product. The olefin product is contacted with a polyolefin-forming catalyst under conditions effective to form the polyolefin. The

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silicocaluminophosphate molecular sieve containing the integrated hydrocarbon co-catalyst has a catalytic activity index for methanol conversion at 250°C of at least 2. Claims 18-26 and 51-62 depend from claim 17 and contain all of the elements of claim 17. Claims 27-30 and 63-66 depend from claim 27 and contain all of the elements of claim 27.

Both claims 17 and 27 teach contacting the silicoaluminophosphate molecular sieve catalyst with a hydrocarbon to form an integrated hydrocarbon co-catalyst within the porous framework structure.

In contrast, Sun teaches a method for increasing the selectivity of a small pore molecular sieve catalyst comprising exposing the small pore molecular sieve catalyst having improved selectivity to a modifier. Sun at col. 2, lines 9-21. The modifier is a polynuclear aromatic heterocyclic compound with at least three interconnecting ring structures. *Id.* Sun also teaches the use of the modified catalyst in an oxygenate to olefin reaction. Sun at col. 4, line 30 to col. 6, line 4. However, Sun does not teach the forming of an integrated hydrocarbon co-catalyst within the porous framework structure of a silicoaluminophosphate molecular sieve. It would be impossible to form the integrated hydrocarbon co-catalyst within the porous structure when the modifier is larger than the pore size.

A polynuclear aromatic heterocyclic compound with at least three interconnecting ring structures cannot penetrate the pores of a small pore molecular sieve catalyst which is define as a catalyst that has a pore size of less than about 5.0 Angstroms. Because the heterocyclic compound cannot penetrate into the pores, it cannot form an integrated hydrocarbon co-catalyst within the porous framework structure. This is supported by statements in Sun. The modifiers of the present invention may be adsorbed onto the catalyst either prior to or simultaneous with the introduction of the oxygenate feed. Sun at column 3, lines 53-55.

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Additionally, the present inventions set forth in claims 17 and 27 have an unexpected result over Sun. The Examples teach the benefit of practicing the present invention over the prior art. Different samples of a selected SAPO sieve were pretreated by exposing the SAPO sieve with different hydrocarbon compounds including acetone in vacuo at 200°C for 1 hour. Results indicated that 1-3 wt.% hydrocarbon co-catalyst is contained within the pores. Example 2 describes the conversion of various catalyst samples including untreated SAPO sieve and SAPO sieve pretreated with acetone as described above. The data from this experiment is shown in Figure 5.

A silicoaluminophosphate molecular sieve having a porous framework structure is contacted with a hydrocarbon (i.e. acetone) at conditions effective (eg. 200C in vacuo for 1 hour) to form at least an integrated hydrocarbon co-catalyst within the porous framework. Next, the silicoaluminophosphate molecular sieve containing the integrated hydrocarbon co-catalyst is contacted with an oxygenate feedstock under conditions effective to convert the feedstock to the olefin product. The pretreated samples were compared against samples that were not pretreated (i.e. as taught in accordance with prior art.

The samples that follow the teaching of the present invention, by pretreatment with acetone, had an ethylene selectivity that was about 10 wt.% greater than the sample that was not pretreated at all reaction times shown. The modified catalyst disclosed in Sun exhibited an increase of approximately 3% in ethylene yield and decrease in propylene yield over an unmodified catalyst. The difference in ethylene yield increase observed in Sun and observed by the present invention is significant. The present invention has a much more favorable increase in ethylene yield, which increase represents an unexpected result. Accordingly, the present invention is not obvious over Sun. Withdrawal of this rejection is respectfully requested.

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Applicants invite the Examiner to telephone the undersigned attorney if there are any issues outstanding which have not been presented to the Examiner's satisfaction.

Respectfully submitted,

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Date

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